NAVY F/A-18
CRASH SURVIVABLE FLIGHT
INCIDENT RECORDER (CSFIR)

TECHNICAL REPORT
OF THE
COORDINATION MEETING
28 April, 1999

CONTRACT GS-24F-3027G
DELIVERY ORDER N00019-99-F-0680
DATA ITEM A001
6 May, 1999

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On 28 April, 1999 representatives from the Navy, Boeing and Smiths Industries (SI) met at the Naval Air Weapons Development Center, China Lake, CA for a Coordination / Kick Off Meeting in support of the F/A-18 Crash Survivable Flight Incident Recorder System (CSFIR) integration program. Smiths Industries is enhancing the software currently under development for its Voice and Data Recorder (VADR®) under this contract. This enhancement will allow the uploading of software updates and version verifications of the F/A-18 flight software via a MIL-STD-1553 multiplex data bus. This will be accomplished using the Memory Loader / Verifier Set (MLVS). A list of attendees is in attachment #1.

A copy of the presentation material is shown in attachment #3. The resulting action items are shown in attachment #2.

Additionally, on 27 April 1999, Smiths Industries witnessed a MLVS demonstration of the uploading of a new OFP into Deployable Flight Incident Recorder Smiths in the F/A-18 simulation laboratory. Smiths Industries connected its computer and 1553 bus card to the bus and captured the bus traffic. This bus traffic capture will be used during the software development effort.

In addition to the briefing material, the following items were discussed.

1. The ICWGs meetings contracted are designed to support general F/A-18 CSFIR issues such as training and familiarization, not just MLVS exclusive issues.
2. All Navy testing of the MLVS CSFIR software will be conducted at China Lake and will be closely coordinated between the MLVS and F/A-18 groups.
3. PMA-209 will furnish the MLVS (action item #2) to SI, however SI will need to procure a Linear Type II PCMCIA card for use with the MLVS.
4. SI will need to obtain software, for example "Card Copy," to program the PCMCIA card in the linear format.
5. SI will need the MLVS connector pin out and signal definitions for its integration / test work. The MLVS currently hooks up to the aircraft 1553 bus and 28volt power. China Lake will supply SI with the MLVS signal definition and pin-out (Action item #1).

This concluded the Coordination Meeting.

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ATTACHMENT #1
F/A-18 CSFIR MLVS Coordination Meeting
28 April, 1999
Attendance List

Name	Organization	Telephone	e-mail
Bales, Cory	CTA (F/A-18 support to NAWCWD)	760-939-3946	BalesCA@navair.navy.mil
Bock, Wolf	EMA (support to PMA-209)	301-863-8988 x390	wolf_bock@emainc.com
Brewer, Gene	NAWCWD China Lake (AV-8B)	760-939-5884	gene.brewer@chinalake.navy.mil
Campbell, Paul	Boeing (support to PMA-257)	301-866-0500	campbell@sfpsi.com
Conquest, Tom	Smiths Industries	616-241-7900	conquest_tom@si.com
Johnson, Rich	NAWCWD-MLVS	760-939-5396	Johnsonrs@navair.navy.mil
Kimmey, Mark	LOGICON (support to PMA-209FB)	301-757-0891	kimmeymc@navair.navy.mil
Maxwell, James	NAWC WD MLVS	760-939-5918	Maxwellj@av8bmx.chinalake.navy.mil
Otten, Bill	Smiths Industries	616-241-8928	otten_william@si.com
Parillo, Bill	NAWCAD/ PMA-209/AIR-4.5.3.2	301-757-6474	parillowa@navair.navy.mil
Sampson, Myrle	NAWCAD/ PMA-265 (AIR 4.8)	301-342-4760	sampsonmp@navair.navy.mil
Smith, Leo	Boeing	314-233-2079	Leo.w.smith@boeing.com
Turnbull, Bill	NAWCWD-MLVS (SW)	760-939-548?	
VanDorp, Jeff	Smith	616-241-7213	Vandorp_jeff@si.com
Vermeulen, Ted	Smiths Industries	616-241-8264	Vermeulen_ted@si.com
Wall, Michael	NAWC WD - 457170D		Wallm@navair.navy.mil
Wilcox, Donna	EMA (support to PMA-209F)	301-863-8988 x371	wilcoxda@navair.navy.mil

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ATTACHMENT #2
F/A-18 CSFIR MLVS Coordination Meeting
28 April, 1999
Action Items

Number	Action Item	Assigned To	Originator	Due Date
1	Provide drawings for MLVS connector pins and signal definition to Si	China Lake	SI	5/19/99
2	Provide MLVS to SI for use under this program	PMA-209	SI	6/1/99

US Navy CSFIR Program

F/A-18 Software Enhancement
1553 / MLVS Upload Capability

Technical Coordination Meeting

April 28, 1999

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27 April 1999

Agenda

- Program Overview / Schedule
- ICD & SRS Changes
- VADR Software Design
- Laboratory Demonstration
- Issues / Concerns / Action Items

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ML VS SI Program Overview / Schedule

- Program Overview
- Task Description
- Deliverables /Data Item Submittals
- Schedule
- Accomplishments to date

Program Overview
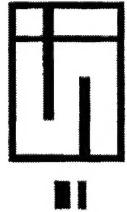
- Update Existing F/A-18 Software to allow Flight Software uploads to the VADR via 1553 from the MLVS

- Software delivered in MLVS format on a floppy per MDC96A0140 rev A

- Software to emulate existing Deployable Flight Incident Recorder

  - DFIR communications protocol defined in Appendix A of MDA 74-870172 rev C)

  - Software Protocol defined in MIL-STD-2217 protocol B

Task Description

- Design, Develop, Test, and Deliver F/A-18 Software with new MLVS upload feature

- Provide Informal Demonstration to Navy at SI

- Provide Interface Change Notice to Boeing to reflect added software capability

- Support Meetings
  - ICWGs at NAS Lemoore, MCAS Beaufort, NAS Oceana
  - Program Reviews at Pax River
  - TIMs at China Lake

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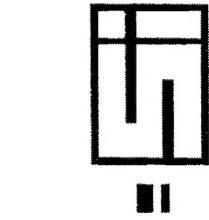
Task Description (cont)

- Update SI Documentation

  – SI Software Requirement Specification

  – SI Software Test Procedure

  – Software Life Cycle documents

  – Software Correlation Drawing

  - Ensure that all VADRs (new production and repaired units) shipped from SI to TACAIR have 'generic' software loaded, capable of accepting software update via 1553 / MLVS and RS422.

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Deliverables / Data Item Submittals

- Technical Report - Coordination Meeting (CDRL A001)

- Updated F/A-18 Software Requirement Specification (CDRL A002)

- F/A-18 Computer Software - Preliminary (CDRL A003)

- F/A-18 Computer Software - Final (CDRL A003)

- Software Design Description - AV-8B and F/A-18 (CDRL A004)

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Schedule (1553 Upload Enhancement)

| ID	Task Name	1Q99		2Q99			3Q99			4Q99			1Q00		
		Feb Mar	Apr	May Jun	Jul	Aug Sep	Oct	Nov Dec	Jan Feb Mar
16	Deliver Final Software (Flight and Grou					◇◆ 8/15			
17	F/A-18 Software Development (Upload E		◆			◆			
18	Engineering Coordination Meeting		◆ 4/28 ▽						
19	Define SW Design Approach		▽						
20	Submit Update SRS (Preliminary)			▽					
21	MLVS to Smiths			◆ 6/1					
22	Submit ICN to Boeing				◆ 6/22				
23	Software Development				▽		▽		
24	Deliver Preliminary Software						◆ 10/15		
25	Navy Testing						▽	▽ 0%	
26	Software Updates						◆ 11/15		
27	Receive Navy Approval							◆ 12/13	
28	Formal Test / Release (SI)							▽ ▽ 0%	
29	Deliver Final Flight Software								◆ 1/25
30									
31									

Accomplishments to date

- Signed Contract (???)

- Reviewed Initial Technical Assumptions (results presented at this coordination meeting)
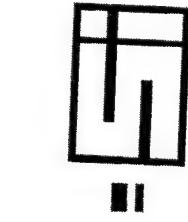
ICD & SRS Changes

- Add MLVS command words to Appendix A of the ICD
- Add MLVS unique Capabilities to SRS

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VADR 1553 Upload
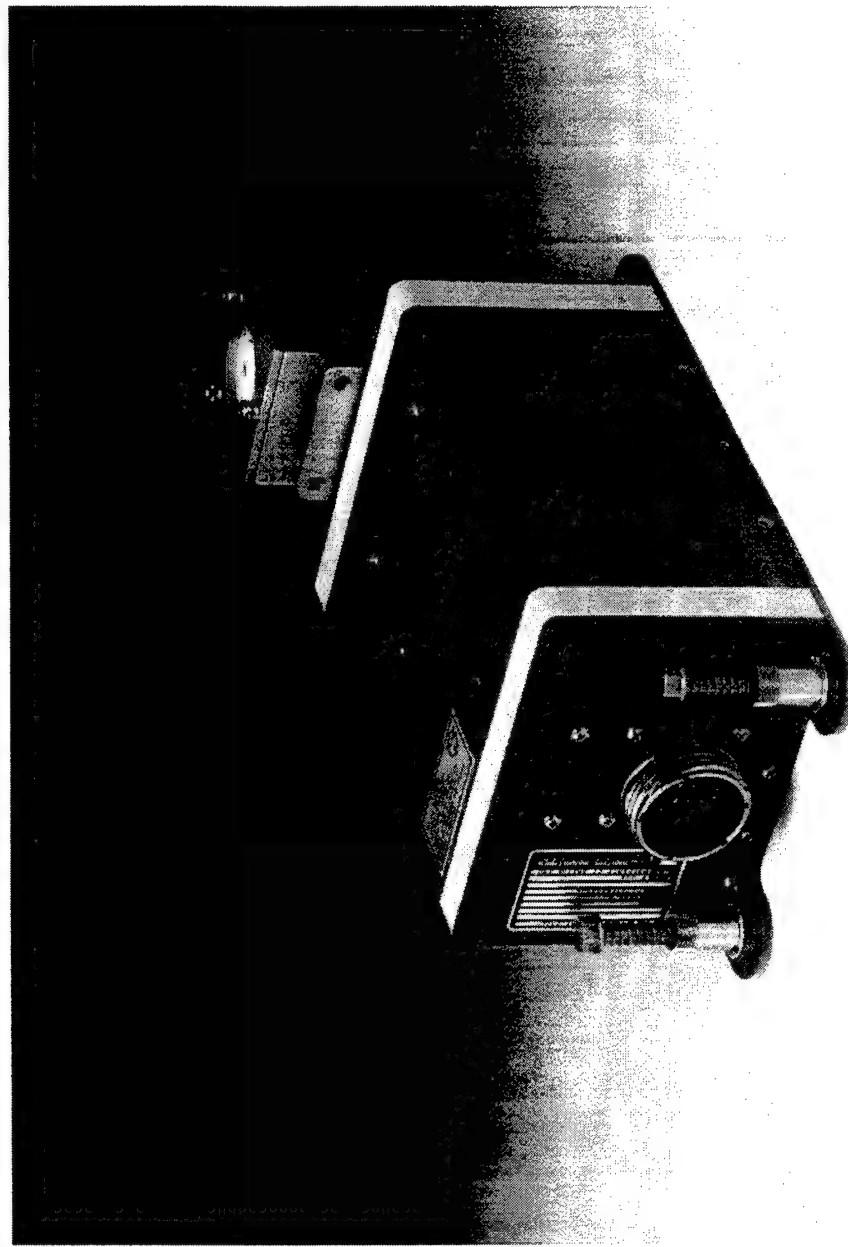
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VADR Software Design

- Overview

- Loader Program (LP)

- Core Software concept

- Control Program and MUX Program design

Overview

MLVS

1553 Bus

MP
LP

CP
LP

RS-422 Bus

VOGP

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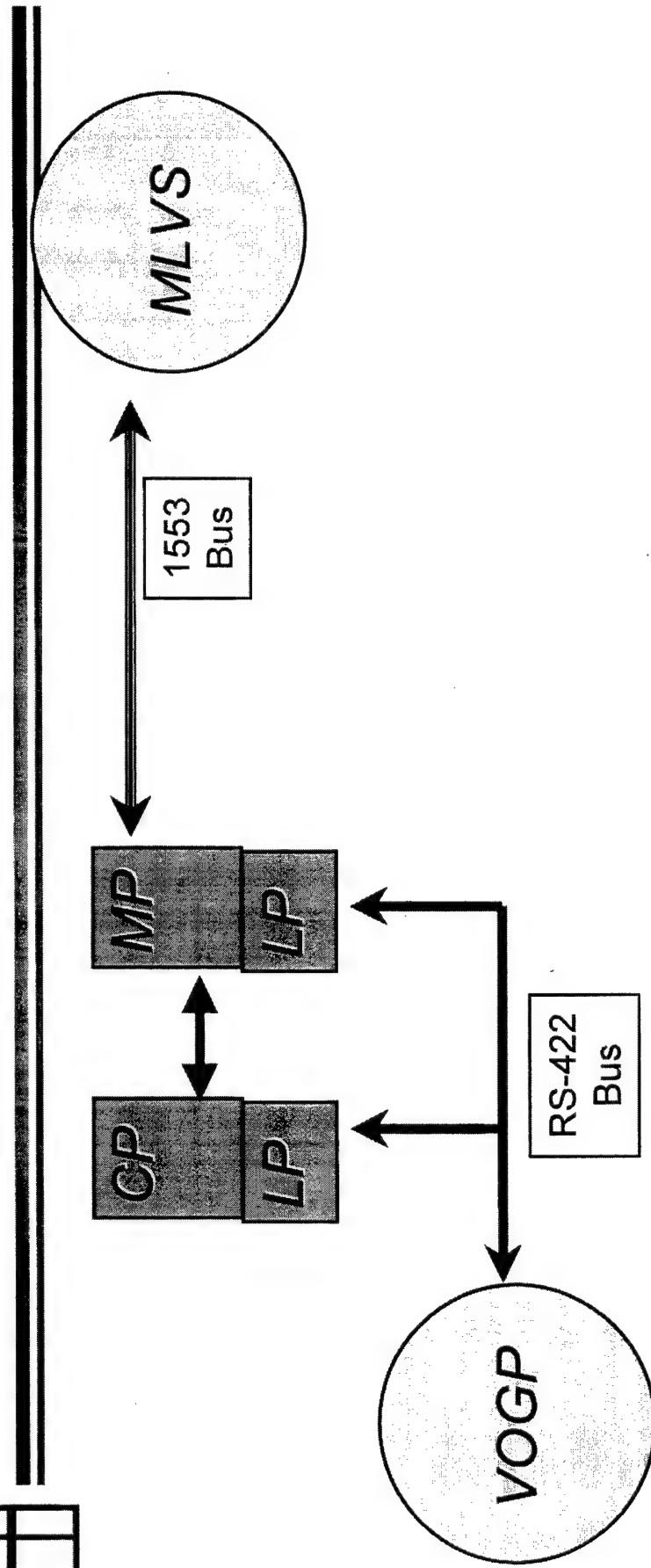
Core Software Concept

- All VADR software functionality contained in core image.

- Core software designed to meet application common requirements.

- Application specific requirements met by filling configuration data structure with application specific values.

- Separate part numbers for Core and Application Software

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Control Program (CP) Core Concept

Configurable Items:

Crash Protected Memory (CPM) Size

CPM Partition Specifications

Frequency Input Sample Rate

Audio Channels

1553 Card Installed

VADR RS-422 Address

Configured CP Part Number

Record Inhibit Parameters

CP

config.
structure
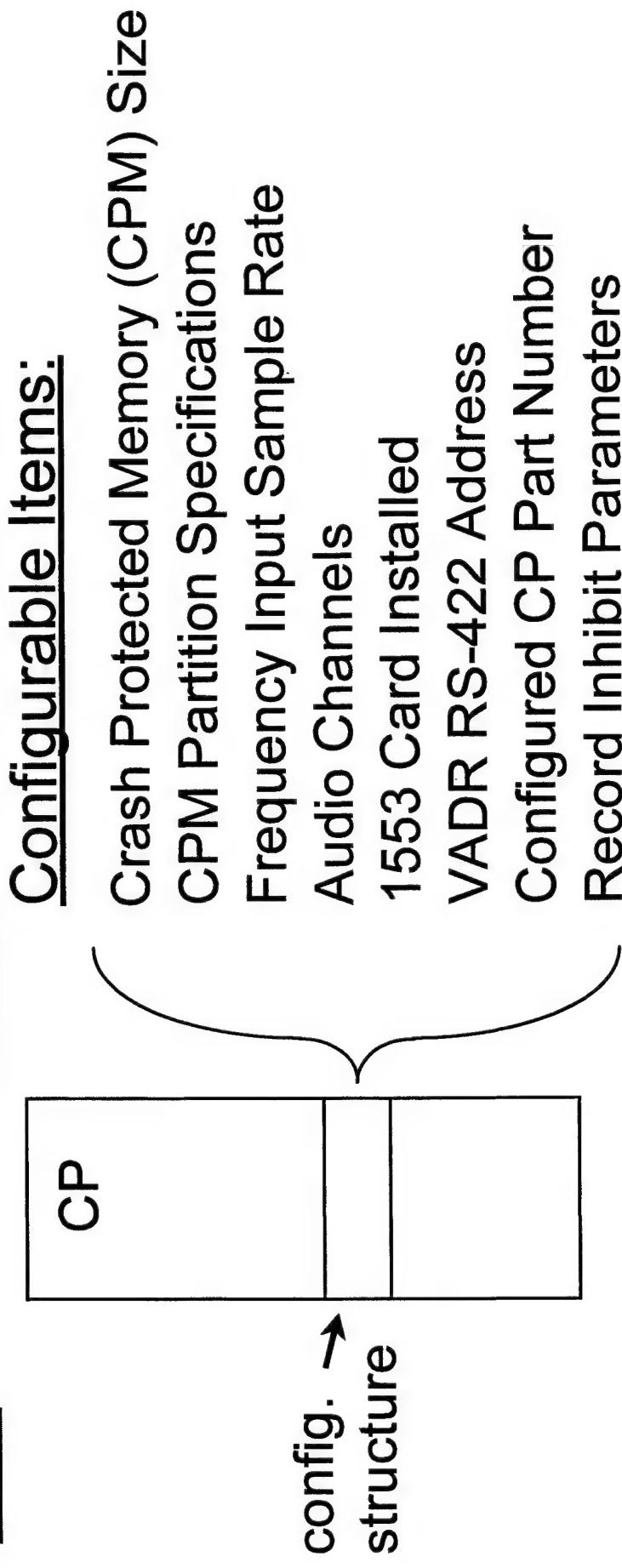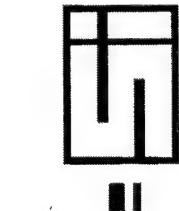
Multiplex Program (MP)

- AV-8B MP uses a core MP concept

- F/A-18 MP does not use core concept because of unique DFIRS protocol.

Loader Program (LP)
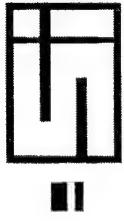
- Allows uploading a CP or MP

- Transfers control to CP or MP

- Exists in program memory with CP and MP

- Executes from RAM when loading

- Uses RS-422

- No Modification (to date) required for
  CSFIR project

1553 Upload Approach
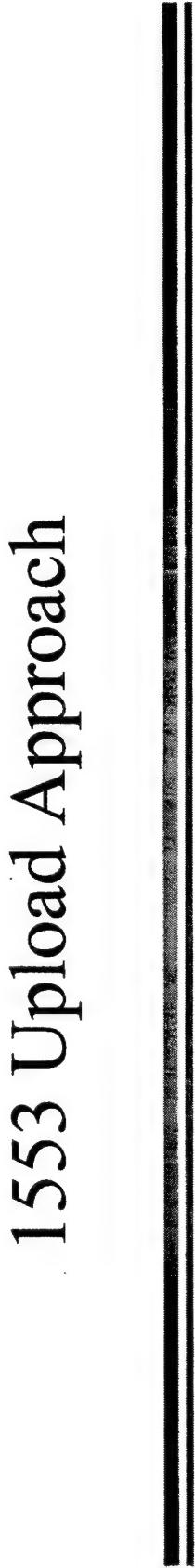
- Add MLVS protocol to F/A-18 MP

- Features:

  – Minimizes impact to other programs

  – Allows different RT addresses for each MP

- Constraints:

  – Requires update to each MP

  – Restricts 1553 upload to only F/A-18 software

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AV-8B 1553 Upload?
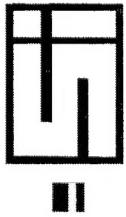
- Currently not a requirement

- Current Software is not configured as an RT

- MLVS requires RT to upload new software

- RT Address same as on F/A-18?

Test Approach

Pre-Production
-01-01 No MLVS
→ China Lake
Testing
→ SRS and Software
Adjustments

Add MLVS
capability
→ Informal Test
at SI
→ Pre-Production
-02-01

China Lake
Testing
→ SRS and Software
Adjustments
→ Final Test
Procedure

Formal Test
→ Test Report
→ Production Release
Software
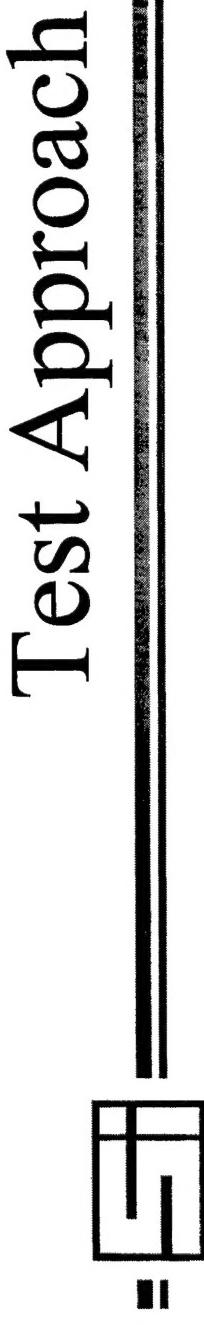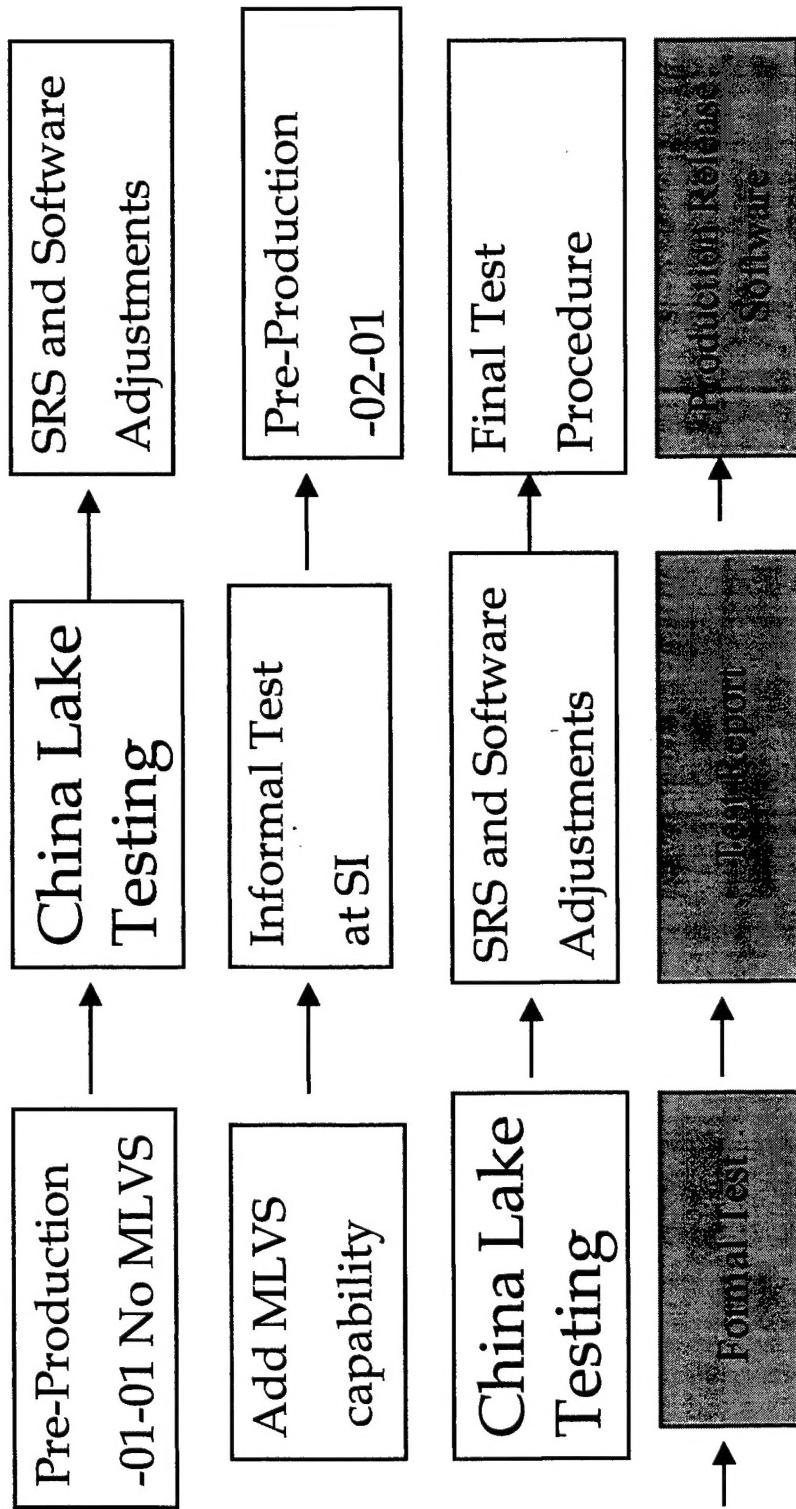
Planned Activities for the Next Two Months

- Finalize Technical approach

- Complete software design

- Begin software coding

- Update SRS

- Provide ICN to Boeing

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Issues / Concerns

- Timing of ICWGs and TIMs

- SW development schedule matches F/A-18 integration and val /ver schedule

- SI requires MLVS loaner unit for software integration testing.

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